

CLAIMS:

- 1 1. A method of fabricating a segmented contactor comprising:
  - 2 forming a contactor unit;
  - 3 testing electrically said contactor unit; and
  - 4 assembling said contactor unit which has passed said testing with a substrate to
  - 5 form said segmented contactor.
- 1 2. The method of claim 1 further comprising retesting said contactor unit after said
- 2 assembling.
- 1 3. The method of claim 1 further comprising forming a plurality of contactor
- 2 units, testing each of said plurality of contactor units, and assembling said tested
- 3 contactor units which have passed said testing with said substrate to form said
- 4 segmented contactor.
- 1 4. The method of claim 1 wherein said contactor unit has a first side and a second
- 2 side and a plurality of electrically conductive areas on said first side.
- 1 5. The method of claim 4 further comprising testing a device on a wafer with said
- 2 segmented contactor, wherein said testing includes electrically connecting each of said
- 3 plurality of electrically conductive areas on said first side of said contactor unit with a
- 4 corresponding one of a plurality of electrically conductive terminals on said device.

1 6. The method of claim 5 wherein each of said electrically conductive terminals  
2 includes a resilient contact element.

1 7. The method of claim 5 wherein each of said conductive areas includes a  
2 resilient contact element.

1 8. The method of claim 1 wherein said assembling said contactor unit includes:  
2 providing an assembly fixture including a plate defining a contactor position;  
3 placing said contactor unit having a first side and a second side into said  
4 contactor position with said first side facing said plate;  
5 applying an adhesive on said second side; and  
6 pressing said substrate onto said adhesive to mount said contactor unit to said  
7 substrate.

1 9. The method of claim 8 wherein said plate defines grooves and the method  
2 further comprising inserting guide blocks into said grooves to define said contactor  
3 position between said guide blocks.

1 10. The method of claim 8 wherein said first side of said contactor unit includes a  
2 plurality of conductive areas.

1 11. A method of fabricating a segmented contactor comprising:  
2 forming a plurality of contactor units on a single contactor substrate;  
3 testing electrically each of said contactor units;  
4 separating each of said contactor units from said single contactor substrate; and  
5 assembling said contactor units which have passed said testing to form said  
6 segmented contactor.

1 12. The method of claim 11 wherein said single contactor substrate is monolithic.

1 13. The method of claim 11 wherein said testing is performed before said separating.

1 14. The method of claim 11 wherein said testing is performed after said separating.

1 15. The method of claim 11 further comprising retesting said contactor units after  
2 said assembling.

1 16. The method of claim 11 wherein said testing is performed after said assembling.

1 17. The method of claim 11 wherein said assembling includes connecting one of  
2 said contactor units with another one of said contactor units.

1 18. The method of claim 11 further comprising testing a plurality of devices on a  
2 wafer with said segmented contactor.

- 1 19. The method of claim 18 wherein one of said plurality of contactor units
- 2 corresponds to at least one of said plurality of devices on said wafer.
- 1 20. The method of claim 18 wherein said devices are integrated circuits.
- 1 21. The method of claim 11 wherein each of said contactor units has a first side and
- 2 a second side.
- 1 22. The method of claim 21 further comprising attaching a plurality of resilient
- 2 contact elements to said first side of at least one of said plurality of contactor units.
- 1 23. The method of claim 21 further comprising providing a plurality of electrically
- 2 conductive areas on each of said first and second sides of each of said contactor units.
- 1 24. The method of claim 23 wherein said electrically conductive areas on said first
- 2 side of a respective contactor unit are electrically connected through said respective
- 3 contactor unit to selected ones of said electrically conductive areas on said second side
- 4 of said respective contactor unit.
- 1 25. The method of claim 24 wherein said contactor unit is an interposer.
- 1 26. A method of fabricating a segmented contactor comprising:
  - 2 forming a plurality of contactor units on a single contactor substrate;

3           attaching a plurality of electrically conductive leads to one of said plurality of  
4    contactor units, wherein said plurality of electrically conductive leads extend  
5    horizontally beyond an edge of said one of said plurality of contactor units;  
6           testing each of said contactor units;  
7           separating each of said contactor units from said single contactor substrate; and  
8           assembling said contactor units which have passed said testing to form said  
9    segmented contactor, wherein said one of said contactor units includes said plurality of  
10   electrically conductive leads.

1   27.   The method of claim 26 wherein said single contactor substrate is monolithic.

1   28.   The method of claim 26 wherein said testing is performed before said separating.

1   29.   The method of claim 26 wherein said testing is performed after said separating.

1   30.   The method of claim 26 further comprising retesting said contactor units after  
2    said assembling.

1   31.   The method of claim 26 wherein said assembling includes connecting one of  
2    said contactor units with another one of said contactor units.

1   32.   The method of claim 26 further comprising testing a plurality of devices on a  
2    wafer with said segmented contactor.

1 33. The method of claim 32 wherein one of said plurality of contactor units  
2 corresponds to at least one of said plurality of devices on said wafer.

1 34. The method of claim 32 wherein said devices are integrated circuits.

1 35. The method of claim 26 wherein each of said contactor units has a first side and  
2 a second side.

1 36. The method of claim 35 further comprising attaching a plurality of resilient  
2 contact elements to said first side of at least one of said plurality of contactor units.

1 37. The method of claim 35 further comprising providing a plurality of electrically  
2 conductive areas on each of said first sides of each of said contactor units.

1 38. The method of claim 37 further comprising providing a plurality of electrically  
2 conductive areas on each of said second sides of each of said contactor units and  
3 wherein said electrically conductive areas on said first side of a respective contactor  
4 unit are electrically connected through said respective contactor unit to selected ones of  
5 said electrically conductive areas on said second side of said respective contactor unit.

1 39. The method of claim 38 wherein said contactor unit is an interposer.

1 40. The method of claim 26 wherein said assembling said contactor units includes:  
2 providing an assembly fixture including a plate defining contactor positions;

3           placing one of said contactor units having a first side and a second side into a  
4    corresponding one of said contactor positions with said first side facing said plate;  
5           applying an adhesive on said second side; and  
6           pressing a backing substrate onto said adhesive to mount said contactor unit to  
7    said backing substrate.

1   41.    The method of claim 40 wherein said plate defines grooves and the method  
2    further comprising inserting guide blocks into said grooves to define said contactor  
3    positions between said guide blocks.

1   42.    The method of claim 40 wherein said first side of said contactor unit includes a  
2    plurality of conductive areas.

1   43.    A method of assembling a segmented contactor, comprising:  
2           providing an assembly fixture including a plate defining a holding space;  
3           placing a contactor unit having a first side and a second side into said holding  
4    space with said first side facing said plate; and  
5           pressing a backing substrate onto said contactor unit to mount said contactor  
6    unit to said backing substrate.

1   44.    The method of claim 43 further comprising forming grooves in said plate, and  
2    inserting guide blocks into said grooves to define said holding space between said  
3    guide blocks.

1 45. The method of claim 43 further comprising providing an adhesive on said  
2 second side of said contactor unit, wherein said backing substrate is pressed onto said  
3 adhesive.

1 46. The method of claim 43 further comprising testing said contactor unit before  
2 placing said contactor unit into said holding space.

1 47. The method of claim 46 further comprising retesting said contactor unit after  
2 said placing said backing substrate onto said contactor unit.

1 48. The method of claim 43 further comprising attaching a plurality of resilient  
2 contact elements to said first side of said contactor unit.

1 49. The method of claim 43 wherein said plate defines a plurality of holding spaces,  
2 and further comprising placing a plurality of contactor units into said plurality of  
3 holding spaces.

1 50. The method of claim 49 wherein at least two of said plurality of contactor units  
2 are electrically connected to each other.

1 51. The method of claim 43 further comprising testing a plurality of devices on a  
2 wafer with said segmented contactor.

1 52. The method of claim 51 wherein said devices are integrated circuits.

1    53.    The method of claim 43 further comprising attaching a plurality of electrically  
2    conductive leads to said contactor unit, said leads extending horizontally beyond an  
3    edge of said contactor unit.

1    54.    A method of fabricating a contactor unit for use in a testing assembly, said  
2    method comprising:  
3           forming at least one tile on a single contactor substrate;  
4           separating said at least one tile from said substrate, wherein said tile has a first  
5    side and a second side and a plurality of conductive areas on said first side; and  
6           testing electrically said at least one tile.

1    55.    The method of claim 54 wherein said testing is performed prior to use of said at  
2    least one tile in said testing assembly.

1    56.    The method of claim 54 wherein said testing is performed before said at least  
2    one tile is assembled in said testing assembly.

1    57.    The method of claim 54 wherein said contactor unit is configured for assembly  
2    with another contactor unit for use in a segmented contactor.

1    58.    A method of repairing a segmented contactor assembly comprising:  
2           removing a selected mounted contactor unit from a backing substrate of said  
3    segmented contactor assembly;

4           testing electrically a replacement contactor unit; and  
5           mounting said replacement contactor unit on said backing substrate.

1   59.    A method of testing a plurality of devices on a wafer comprising:  
2           providing a segmented contactor including a plurality of contactor units,  
3           wherein each of said plurality of contactor units includes a tile having a first side and a  
4           second side, said tile having electrically conductive areas on said first side for  
5           contacting corresponding electrically conductive terminals on said devices, said tile  
6           further having a plurality of electrically conductive leads extending beyond an edge of  
7           said tile;  
8           connecting said plurality of leads to an external testing instrument;  
9           bringing said terminals on said devices on said wafer into contact with  
10          corresponding conductive areas on said tiles;  
11          energizing said contactor units; and  
12          performing a test on said devices on said wafer.

1   60.    An electrical testing assembly, which is a segmented contactor for testing a  
2          device, said electrical testing assembly comprising:  
3           a substrate;  
4           a plurality of contactor units assembled with said substrate, said plurality of  
5          contactor units having been tested electrically prior to being assembled with said  
6          substrate to form said segmented contactor; and  
7           a plurality of electrically conductive areas arranged on each of said contactor  
8          units configured to be electrically connected to the device.

1 61. The assembly of claim 60 further comprising a plurality of electrically  
2 conductive leads extending from each of said contactor units, said leads configured for  
3 connection to an external instrument.

1 62. The assembly of claim 60 wherein said leads of each contactor unit are contained  
2 in a flexible strip, said strip secured to said corresponding contactor unit and extending  
3 laterally from said corresponding contactor unit.

1 63. The assembly of claim 60 wherein each of said contactor units are removably  
2 mounted to said substrate.

1 64. The assembly of claim 60 wherein said contactor units are mounted to said  
2 substrate with an adhesive.

1 65. The assembly of claim 60 wherein said contactor units are mounted to said  
2 substrate with a conductive material.

1 66. The assembly of claim 65 wherein said conductive material is electrically  
2 conductive.

1 67. The assembly of claim 65 wherein said conductive material is thermally  
2 conductive.

1 68. The assembly of claim 60 wherein said contactor units are coplanar with each  
2 other.

1 69. The assembly of claim 60 wherein said substrate is silicon.

1 70. The assembly of claim 60 wherein said contactor units are made of silicon.

1 71. The assembly of claim 60 wherein said contactor units are made of a material  
2 including  $\text{SiO}_2$ .

1 72. The assembly of claim 60 wherein said contactor units are made of a flexible  
2 material.

1 73. The assembly of claim 60 wherein said contactor units are made of an organic  
2 material.

1 74. The assembly of claim 60 wherein the materials of said substrate and said  
2 contactor units have substantially similar coefficients of thermal expansion.

1 75. The assembly of claim 60 wherein a selected one of said plurality of contactor  
2 units is electrically connected to at least another one of said plurality of contactor units.

1 76. The assembly of claim 75 wherein said connected contactor units are connected  
2 with wire connections.

1 77. The assembly of claim 75 wherein said connected contactor units are connected  
2 with a flexible circuit.

1 78. The assembly of claim 60 further comprising an alignment mechanism between  
2 said contactor units.

1 79. The assembly of claim 60 wherein said device is an integrated circuit.

1 80. The assembly of claim 60 further comprising a plurality of devices.

1 81. The assembly of claim 80 wherein each of said plurality of devices is an  
2 integrated circuit.

1 82. A contactor unit comprising:

2 a tile having a first side and a second side and including a plurality of  
3 conductive areas on said first side; and  
4 a plurality of leads secured to selected conductive areas, said leads extending  
5 laterally beyond an edge of said tile.

1 83. The contactor unit of claim 82 wherein said leads are within a flexible strip.

1 84. The contactor unit of claim 82 further comprising a connector on said leads for  
2 connecting to an external testing device.

1 85. The contactor unit of claim 82 wherein said contactor unit is certified for use in  
2 a segmented contactor assembly by being electrically tested.

1 86. The contactor unit of claim 85 wherein said contactor unit is configured to be  
2 mounted on a backing substrate, and wherein said contactor unit is electrically tested  
3 before being mounted to said backing substrate.